

**Sunol Valley Groundwater Basin**

Groundwater Basin Number: 2-11

County: Alameda

Surface Area: 16,600 acres ( 26 square miles)

**Basin Boundaries and Hydrology**

The Sunol Valley Groundwater Basin occupies a structural trough in the central Coast Ranges east of the San Francisco Bay and is completely surrounded by hills of the Diablo Range. Streams in the drainage area include Alameda, La Costa, Sinbad, Indian, Vallecitos, San Antonio Creeks, and Arroyo de la Laguna. The general direction of groundwater movement appears to be from the upland areas toward Alameda Creek and then westward toward the outlet of the basin. Sunol Valley Groundwater Basin is cut by several faults including the Calaveras, Sinbad, Stonybrook and Maguire Peaks which impair the lateral movement of ground water.

Mean annual precipitation in the basin ranges from 17 to 20 inches increasing from east to west.

**Hydrogeologic Information****Water Bearing Formations**

Rocks of water-bearing formations make up the floor of the Sunol Valley, as well as the lower portions of the La Costa and Vallecitos Valleys. Under most conditions, these rocks yield adequate to large quantities of groundwater to wells. The quality of water produced from these rocks ranges from poor to excellent, with most water in the good to excellent range. The water-bearing formations consist of deposits ranging in age from late Pliocene to the present. These deposits were laid down under continental conditions in alluvial fans, outwash plains, and lakes. They include Plio-Pleistocene sediments of the Livermore Formation and more recent Quaternary alluvium.

**Plio-Pleistocene, Livermore Formation.** The Livermore Formation is of Plio-Pleistocene age. The Livermore Formation is prominently exposed over broad regions of the Sunol Valley. It also lies beneath both La Costa and Vallecitos Valleys at relatively shallow depths. This formation is up to 4,000 feet thick and consists of unconsolidated to semi-consolidated beds of gravel, sand, silt, and clay. Limey concretions are fairly common in its lower portion, and tuffaceous beds are present at its base. The source

of the coarse-grained Livermore Formation is probably the Jurassic and Cretaceous rocks to the south. These grains consist of black to red chert, micaceous sandstone, black shale, and quartzite. (DWR, 1966)

**Quaternary Alluvium.** Deposits of Pleistocene to Recent age are grouped together as Quaternary alluvium. The Quaternary alluvium consists of stream and lake deposited sediments including various mixtures of gravel, sand, silt and clay. It is largely unconsolidated and overlies the Livermore Formation in the valleys. (DWR, 1966) Terrace deposits occur along the San Antonio and Alameda Creeks. They overlie semiconsolidated deposits of the Livermore Formation and consolidated marine sediments. The deposits are comprised of poorly bedded boulders, cobbles, pebbles, sand and silt. (DWR, 1974)

#### **Restrictive Structures (optional)**

Within the Sunol Valley groundwater basin, faults are the major structural features known to have marked effect on the movement of groundwater. Faults in this region tend to act as barriers to the lateral movement of groundwater. The resulting groundwater levels stand higher on the up-gradient side. (DWR, 1974)

#### **Recharge Areas (optional)**

Recharge in the Sunol basin occurs by infiltration of surface water along Alameda Creek, Arroyo de la Laguna, San Antonio Creek and Vallecitos Creek. (DWR, 1974)

#### **Groundwater Level Trends**

The Alameda Watershed Management Plan (1999) reviewed data from nearly 18 existing monitoring wells in the Sunol Valley. The data indicated that shallow groundwater levels in the alluvium typically occurs 20 to 30 feet below the ground surface and groundwater flow is parallel to Alameda Creek.

#### **Groundwater Storage**

**Groundwater Storage Capacity.** The lack of historical groundwater depletion and the availability

of only a few well logs make it difficult to reliably determine the storage capacity of the Sunol Valley Groundwater Basin.

**Groundwater in Storage.** The lack of groundwater information available makes it difficult to reliably determine the amount of groundwater in storage for the Sunol Valley Groundwater Basin.

### **Groundwater Quality**

**Characterization.** The quality of groundwater in Sunol Valley is good, having been replenished by good quality surface water from Alameda Creek and other streams tributary to the basin. Averages of significant mineral constituents range as follows: total dissolved solids, 200 to 800 mg/l; total hardness, 100 to 350 mg/l; and boron, 0.03 to 0.5 mg/l. The quality of groundwater in the Sunol Valley is generally suitable for irrigation. High nitrate levels in some shallow wells indicate possible degradation from surface sources. (DWR, 1974)

### **Impairments.**

### **Groundwater Budget (Type C)**

Due to lack of groundwater budget data, inflows, including natural, applied, and artificial recharge and outflows including urban and agricultural extraction have not been included.

### **Well Production Characteristics**

<b>Well Yields: (gal/min)</b>	Municipal/Irrigation: Range: –                      Average:
<b>Production Depths: (ft)</b>	Total depths of completed wells Domestic:                      Range: 140 - 452                      Average: 253 Municipal/Irrigation: Range: 110 - 430                      Average: 312

**Active Monitoring Data**

<b>Agency</b>	<b>Parameter</b>	<b>Number of Wells /Measurement Frequency</b>
	Groundwater levels	Unknown
	Miscellaneous water quality	Unknown
Department of Health Services and cooperators	Title 22 water quality	2 wells

**Basin Management**

<b>Groundwater Management:</b>	Non identified
<b>Water Agencies:     Public</b>	California Water Service Company, Pleasanton Township County Water District, San Francisco Water Department, Valley Community Services District, East Bay Municipal Utility district and Sone 7 of the Alameda County Flood Control and Water Conservation District
<b>Private</b>	

**References Cited**

California Department of Water Resources, Bulletin No. 118-2, Evaluation of Groundwater Resources: Livermore and Sunol Valleys, Appendix A: Geology, August 1966.

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California Department of Water Resources, Memorandum Report, Livermore and Sunol Valleys, Evaluation of Groundwater Resources through 1968, June 1970.

San Francisco Planning Department, Alameda Watershed Management Plan, Draft EIR, December 1999.

Enviromental Science Associates, Alameda County Water District Integrated Resources Plan and 1996-2001 Capital Improvement Program, May 1998.

**Additional References**

- Oakeshott, G.O. 1973, Geologic map of Contra Costa County: California Division of Mines, Journal Vol. 54, No. 4, Plate 5
- Jennings, O.P. 1973, Geologic map of California: California Division of Mines and Geology, Geologic Map Series, San Francisco Sheet, scale 1:250,000.
- California Department of Water Resources, Bulletin No. 77-58, Ground Water Conditions in Central and Northern California 1957-58, October 1959.
- California Department of Water Resources, Bulletin No. 130-72, Volume II Northeastern California, December 1973.
- California Department of Water Resources, Bulletin No. 118-80, Ground Water Basins in California, January 1980.
- California Department of Water Resources, Bulletin No. 62-5, Sea-Water Intrusion in California, October 1975.